



DEPARTMENT OF HOMELAND SECURITY

[Docket No. ICEB-2021-0011]

RIN 1653-ZA23

Update to the Department of Homeland Security STEM Designated Degree Program List

AGENCY: U.S. Immigration and Customs Enforcement (ICE); Department of Homeland Security (DHS).

SUMMARY: This notice announces that the Secretary of Homeland Security (Secretary) is amending the DHS STEM Designated Degree Program List by adding 22 qualifying fields of study and a corresponding Department of Education Classification of Instructional Programs (CIP) code for each. The list is used to determine whether a degree obtained by certain F-1 nonimmigrant students following the completion of a program of study qualifies as a science, technology, engineering, or mathematics (STEM) degree as determined by DHS, for the F-1 student to be eligible to apply for a 24-month extension of their post-completion optional practical training (OPT).

DATES: DHS adopts the list announced in this notice as of [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

FOR FURTHER INFORMATION CONTACT: Sharon Snyder, Unit Chief, Policy and Response Center Unit, Student and Exchange Visitor Program; U.S. Immigration and Customs Enforcement, 500 12th Street, SW, Stop 5600, Washington, D.C., 20536-5600; email: sevp@ice.dhs.gov, telephone: (703) 603-3400. This is not a toll-free number. Program information is available at <http://www.ice.gov/sevis/>.

SUPPLEMENTARY INFORMATION:

What action is DHS taking under this notice?

The Department of Homeland Security (DHS) is updating the list of STEM fields of study that fall within the regulatory definition of “STEM field.” The list, known as the DHS STEM

Designated Degree Program List (“STEM list”),¹ is used to determine whether a degree obtained by an F-1 nonimmigrant student qualifies as a STEM degree, as required for the F-1 nonimmigrant student to be eligible to apply for a STEM OPT extension. Similar prior lists were updated through Student and Exchange Visitor Program (SEVP) Broadcast Messages in 2011² and 2012.³ The current list was established in connection with a Final Rule issued in 2016. In 2021, DHS updated the list to include technical changes to CIP codes made by the Department of Education’s National Center for Education Statistics (NCES) as part of NCES’s 2020 CIP update.⁴

Why is DHS taking this action?

In 2016, DHS published a Final Rule providing a 24-month extension of OPT for F-1 nonimmigrant students who majored in a designated STEM field of study. *See* 81 FR 13039 (Mar. 11, 2016) (“*Improving and Expanding Training Opportunities for F-1 Nonimmigrant Students With STEM Degrees and Cap-Gap Relief for All Eligible F-1 Students*”) (“2016 STEM Rule”). The 2016 STEM Rule stated that DHS will continue to accept for consideration suggested additions or deletions to the STEM list and may publish updates to the STEM list in the Federal Register. Since publication of the 2016 STEM Rule, DHS has received from the public 97 suggested new fields of study to add to the STEM list. DHS has not received any input from the public suggesting fields to remove. DHS is now announcing that a number of the fields of study submitted for consideration will be added to the STEM list.⁵ Nominators may resubmit a nomination with additional supporting views and evidence at any time if their original submission was not addressed in this notice.

What is OPT and STEM OPT?

¹ ICE, DHS STEM Designated Degree Program List, <https://www.ice.gov/sites/default/files/documents/stem-list.pdf> ([last visited Nov. 9, 2021](#)).

² See SEVP, “Broadcast Message 1105-02: Additions to the STEM-Designated Degree Program List,” May 12, 2011.

³ See SEVP, “Broadcast Message 1204-07: Additions to the STEM-Designated Degree Program List,” May 11, 2012.

⁴ See SEVP, “Broadcast Message 2102-01: Updated DHS STEM Designated Degree Program List Available,” Feb. 1, 2021, *available at* <https://www.ice.gov/doclib/sevis/pdf/bcm2102-01.pdf> (last visited Nov. 9, 2021).

⁵ While the 2016 STEM Rule provided for “additions or deletions to the list,” no deletions will be made at this time.

OPT is one type of work permission available to certain F-1 nonimmigrant students. It allows students (except those in English language training programs) to obtain real-world work experience directly related to their field of study.

The STEM OPT extension is a 24-month extension of OPT available to F-1 nonimmigrant students who have completed 12 months of OPT and received a degree in an approved STEM field of study as designated by the STEM list.

Who may be impacted by this notice?

This notice may impact qualifying F-1 nonimmigrant students who seek a 24-month extension of post-completion OPT.

Where can I find the STEM list?

The STEM list can be found in the docket for this notice and on the SEVP website.⁶

What authority does DHS have to make changes to the STEM list?

The Secretary has broad authority to administer and enforce the nation's immigration laws. *See generally* 6 U.S.C. 202; Immigration and Nationality Act of 1952, as amended (INA), Sec. 103, 8 U.S.C. 1103. Section 101(a)(15)(F)(i) of the INA establishes the F-1 nonimmigrant classification for individuals who wish to enter the United States temporarily and solely for the purpose of pursuing a full course of study at an academic institution or accredited language training school certified by the U.S. Immigration and Customs Enforcement's (ICE) SEVP. *See* INA Sec. 101(a)(15)(F)(i), 8 U.S.C. 1101(a)(15)(F)(i). The INA provides the Secretary with broad authority to determine the time and conditions under which nonimmigrants, including F-1 students, may be admitted to the United States. *See* INA Sec. 214(a)(1), 8 U.S.C. 1184(a)(1). The Secretary also has broad authority to determine which individuals are authorized for employment in the United States. *See* INA Sec. 274A(h)(3), 8 U.S.C. 1324a(h)(3). Finally, the Secretary, or his or her designee, has authority to maintain the STEM list, which is a complete list of qualifying degree program categories published on the SEVP website

⁶ *See* SEVP, Eligible CIP Codes for the STEM OPT Extension, <https://studyinthestates.dhs.gov/stem-opt-hub/additional-resources/eligible-cip-codes-for-the-stem-opt-extension> (last visited Nov. 9, 2021).

at <http://www.ice.gov/sevis>. Changes that are made to the STEM list may also be published in a notice in the *Federal Register*. See 8 CFR 214.2 (f)(10)(ii)(C)(2)(ii).

Who may nominate a CIP code?

Interested parties, including members of the public, may nominate a CIP code for inclusion on or removal from the STEM list.

How does DHS assess nominations?

Nominations to add or remove degrees from the STEM list are assessed consistent with the authorizing regulation.⁷ As defined in the governing regulations, a STEM field is a field included in the CIP taxonomy⁸ that falls within the two-digit series containing engineering, biological sciences, mathematics and statistics, and physical sciences, or a related field, which generally involves research, innovation, or development of new technologies using engineering, mathematics, computer science, or natural sciences (including physical, biological, and agricultural sciences). See 8 CFR 214.2 (f)(10)(ii)(C)(2)(i). This definition is widely used by U.S. institutions of higher education and provides an objective measure by which to identify STEM fields of study.

As noted above, by regulation,⁹ DHS has designated four areas as core STEM fields and lists these four areas at the two-digit CIP code level. As a result, any new additions to those areas are automatically included on the STEM list. These four areas are: Engineering (CIP code 14), Biological and Biomedical Sciences (CIP code 26), Mathematics and Statistics (CIP code 27), and Physical Sciences (CIP code 40). If a degree is not within the four core fields, DHS considers whether the degree is in a STEM-related field listed at the six-digit level. The six-digit designation allows for individualized review of a specific field of study to ensure it meets the “related field” criteria of “involving research, innovation, or development of new technologies using engineering,

⁷ See 8 CFR 214.2(f)(10)(ii)(C)(2).

⁸ The CIP taxonomy is a taxonomic scheme that was developed by the Department of Education's National Center for Education Statistics (NCES) to support the accurate tracking and reporting of fields of study and program completion activity. See the NCES website (<https://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>) (last visited Sept. 22, 2021).

⁹ 8 CFR 214.2(f)(10)(ii)(C)(2)(i).

mathematics, computer science, or natural sciences (including physical, biological, and agricultural sciences).”

SEVP evaluates submissions to assess whether the degree is generally considered to be a STEM degree by recognized authorities, including input from educational institutions, governmental entities, and non-governmental entities. SEVP also reviews the NCES definition of the CIP code and any supporting material submitted by the nominator such as the required curriculum for the degree and the extent to which it is comprised of core STEM disciplines as well as research, innovation, and development of new technologies using engineering, mathematics, computer science, or natural sciences (including physical, biological, and agricultural sciences). The degree requirements and curriculum may be assessed across academic institutions to ensure that the core aspects of the degree are sufficiently consistent among educational institutions.

A proposed addition does not have to have all supporting elements to be added to the STEM list. DHS assesses the totality of a submission and may approve a proposed CIP code if it presents sufficient evidence and reasoning to establish that the regulatory definition of a STEM field encompasses the degree under consideration.

How may a nomination be submitted?

Nominations may be submitted by email to the SEVP Response Center at SEVP@ice.dhs.gov, with the subject line “Attention: STEM CIP Code Nomination.”

What new fields of study will be added to the STEM list?

The following fields of study are being added to the STEM list:

Bioenergy (03.0210). *A program of study that focuses on the environmental and economic impact of using plants and microbes for the production of bio-based fuels such as ethanol and biodiesel.*

Includes instruction in biochemical engineering, bioprocessing, bioseparations, conversion, feedstock, economics, environmental sustainability, hydrology, and natural resource management.

This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. This field of study, as described in the NCES definition, is comprised of STEM disciplines such as

research, innovation, and development of new technologies using biological science. Bioenergy is classified as STEM by the Department of Veterans Affairs¹⁰ and the National Science Foundation.¹¹

Forestry, General (03.0501). *A program that generally prepares individuals to manage and develop forest areas for economic, recreational, and ecological purposes. Includes instruction in forest-related sciences, mapping, statistics, harvesting and production technology, natural resources management and economics, wildlife sciences, administration, and public relations.* This field of study, as described in the NCES definition, is comprised of STEM disciplines such as research, innovation, or development of new technologies using biological science. Forestry, General is classified as STEM by the Department of Veterans Affairs and the National Science Foundation. This CIP code nomination included the Society of American Foresters' curricular requirements, which demonstrated instruction in STEM disciplines.

Forest Resources Production and Management (03.0510). *A program that focuses on the application of forestry principles to the production, harvesting, and processing of forest resources and that prepares individuals to perform associated technical and managerial functions. Includes instruction in forest production and utilization, industrial forestry, agroforestry, transplantation, timber harvesting, selection and identification of trees, processing technologies and systems, equipment operations and maintenance, and related management skills.* This field of study, as described in the NCES definition, is comprised of STEM disciplines such as research, innovation, or development of new technologies using biological science. Forest Resources Production and Management is classified as STEM by the Department of Veterans Affairs and the National Science Foundation. This CIP code nomination included the Society of American Foresters' curricular requirements, which demonstrated instruction in STEM disciplines.

¹⁰ See Department of Veterans Affairs STEM Designated Degree Program List at https://benefits.va.gov/gibill/docs/fgib/STEM_Program_List.pdf (last accessed Nov. 2, 2021).

¹¹ See National Science Foundation STEM Classification of Instructional Programs Crosswalk at https://www.lsamp.org/help/help_stem_cip.cfm (last accessed Nov. 2, 2021).

Human-Centered Technology Design (11.0105). *A program that focuses on incorporating a human perspective into designing, researching, and creating technological interfaces. Includes instruction in design, human-computer interaction, learning, neuroscience, perception, product design, user-centered design, and usability.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using computer science and neuroscience, among other disciplines. Human-Centered Technology Design is classified as STEM by the Department of Veterans Affairs and the National Science Foundation.

Cloud Computing (11.0902). *A program that prepares individuals to design and implement enterprise software systems that rely on distributed computing and service-oriented architecture, including databases, web services, cloud computing, and mobile apps. Includes instruction in data management, distributed and cloud computing, enterprise software architecture, enterprise and cloud security, mobile systems and applications, server administration, and web development.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using computer science. Cloud Computing is classified as STEM by the Department of Veterans Affairs.

Anthrozoology (30.3401). *A program of study that combines anthropology and zoology in order to examine the relationship between animals and humans. Includes instruction in animal behavior and communication, animal welfare, animal conservation, animal training, animal-assisted therapy techniques, biology, ethics, and education.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using biological science.

Climate Science (30.3501). *A program that focuses on the scientific study of the climate system of the earth with emphasis on the physical, dynamical, and chemical interactions of the atmosphere,*

ocean, land, ice, and the terrestrial and marine biospheres. Includes instruction in biology, chemistry, climate analysis, climate change adaptation/mitigation, climate policy, ecology, energy development, environmental impacts, marine chemistry, meteorology, and oceanography. This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using physical and biological sciences.

Earth Systems Science (30.3801). *A program that focuses on the interaction of the Earth's oceanographic, atmospheric, and terrestrial systems. Includes instruction in biogeochemistry, climate dynamics, geographical information science (GIS), geophysics, hydrology, landscape ecology, meteorology, and satellite remote sensing analysis.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using physical and biological sciences.

Economics and Computer Science (30.3901). *A program of study that focuses on the theoretical and practical connections between computer science and economics. Includes instruction in data analysis, database design, data mining, computer algorithms, economics, econometrics, computer programing, mathematics, and statistics.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics and computer science.

Environmental Geosciences (30.4101). *A program that focuses on the scientific study of the environmental implications of geological processes and human activities on Earth. Includes instruction in environmental/natural resource management, geographic information systems (GIS), geology, hydrology, regulatory agency compliance, hazard identification and mitigation, environmental law, environmental policy, and sustainability studies.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of

study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using biological science and computer science.

Geobiology (30.4301). *A program that focuses on the scientific study of how living things interact with geological systems. Includes instruction in evolution of Earth systems, geochemistry, geology, geomicrobiology, marine chemistry, paleobiology, paleoecology, paleontology, and petrology.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using biological science.

Geography and Environmental Studies (30.4401). *A program that focuses on interactions between people and the natural and built environments. Includes instruction in climate science, sustainability, environmental science and policy, research methods, geographic information systems (GIS), human geography, physical geography, remote sensing, and public policy.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using biological science and computer science.

Mathematical Economics (30.4901). *A program that focuses on the application of mathematical methods to the development of economic theory, models, and quantitative analysis. Includes instruction in data analysis, applied business economics, calculus, econometrics, linear algebra, microeconomic theory, probability, and statistical methods.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics.

Mathematics and Atmospheric/Oceanic Science (30.5001). *A program that focuses on the application of mathematics to atmospheric and oceanic problems. Includes instruction in chemistry, physics, atmospheric/ocean dynamics, climatology, weather simulation, climate modeling, mathematics, oceanography, and atmospheric science.* This is a new CIP code created by NCES and

added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics and physical sciences.

Data Science, General (30.7001). *A program that focuses on the analysis of large-scale data sources from the interdisciplinary perspectives of applied statistics, computer science, data storage, data representation, data modeling, mathematics, and statistics. Includes instruction in computer algorithms, computer programming, data management, data mining, information policy, information retrieval, mathematical modeling, quantitative analysis, statistics, trend spotting, and visual analytics.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics and computer science. This CIP code nomination included a letter of support from the Academic Data Science Alliance, which was signed by dozens of representatives of institutions of higher education and corporate and academic entities.

Data Analytics, General (30.7101). *A program that prepares individuals to apply data science to generate insights from data and identify and predict trends. Includes instruction in computer databases, computer programming, inference, machine learning, optimization, probability and stochastic models, statistics, strategy, uncertainty quantification, and visual analytics.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics and computer science.

Business Analytics (30.7102). *A program that prepares individuals to apply data science to solve business challenges. Includes instruction in machine learning, optimization methods, computer algorithms, probability and stochastic models, information economics, logistics, strategy, consumer behavior, marketing, and visual analytics.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in

the STEM disciplines such as research, innovation, or development of new technologies using mathematics and computer science. This CIP code nomination included supporting information on the curricula required for the degree, which demonstrated instruction in STEM disciplines.

Data Visualization (30.7103). *A program that prepares individuals to organize and derive meaning from data by using visual presentation tools and techniques. Includes instruction in cognitive science, computer programming, data management, data visualization theory, graphic design, infographics, perceptual psychology, statistics, and visual design.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics and computer science.

Financial Analytics (30.7104). *A program that focuses on financial big data modeling from algorithms to cloud-based data-driven financial technologies. Includes instruction in financial analytics, financial data processing, knowledge management, data visualization, effective decision communication, machine learning for finance, statistical inference and dynamic modeling on financial data, and project management.* This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics and computer science.

Data Analytics, Other (30.7199). *Any instructional program in data analytics not listed above.* The NCES definition of this field of study encompasses any related programs not covered by Data Analytics, General; Business Analytics; Data Visualization; and Financial Analytics, which all describe instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics and computer science. This is a new CIP code created by NCES and added to its decennial 2020 update to the CIP.

Industrial and Organizational Psychology (42.2804). *A program that focuses on the scientific study of individual and group behavior in institutional settings, applications to related problems of*

organization and industry, and that may prepare individuals to apply such principles in industrial and organizational settings. Includes instruction in group behavior theory, organizational theory, reward/punishment structures, human-machine and human-computer interactions, motivation dynamics, human stress studies, environmental and organizational influences on behavior, alienation and satisfaction, and job testing and assessment. The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics. This CIP code nomination included supporting evidence from the Society for Industrial and Organizational Psychology (SIOP) on data-driven research and analysis to address human-centered issues in institutional and organizational settings such as workplace dysfunction and employee engagement. The nomination also included specific examples demonstrating the application of statistical analysis to large data sets as part of an overall curriculum approach and its use in identifying potential solutions to human interface problems that are increasingly predominant in post-industrialized workplaces. These examples include case studies of industrial and organizational psychology methodology specifically applied in the government sphere, including a National Aeronautics and Space Administration grant awarded to a SIOP member to study astronaut health and performance on long-duration missions and the use of industrial and organizational psychology research and data to improve airline safety and assist members of the military in transitioning to civilian life. The examples are indicative of the research inquiry and mathematical applications inherent to this program of study and how they have provided real-world solutions to complex problems.

Social Sciences, Research Methodology and Quantitative Methods (45.0102). *A program that focuses on the design of research studies, measurement of variables, data analysis, and formulation of models. Includes instruction in experimental, quasi-experimental, and case study methods; historical research; participant observation; questionnaire design; sampling theory; and statistical methods.* The NCES definition of this field of study describes instruction in the STEM disciplines such as research, innovation, or development of new technologies using mathematics. This CIP code

nomination included a letter of support from the National Academies of Sciences, Medicine, and Engineering and supporting materials from the American Sociological Association.

Paperwork Reduction Act (PRA)

Eligible students are required to submit a Form I-765, “Application for Employment Authorization,” to request employment authorization and an Employment Authorization Document, and a Form I-983, “Training Plan for STEM OPT Students,” to ensure that they are receiving the academic and training benefits of the STEM OPT extension. Consistent with the PRA, the Office of Management and Budget (OMB) has previously approved the collection of information contained on the current Form I-765 (OMB Control No. 1615-0040) and Form I-983 (OMB Control No. 1653-0054). Although there could be a slight increase in the number of filings for both the Form I-765 and Form I-983 because of this notice, the number of filings currently contained in the OMB annual inventory is sufficient to cover any additional filings. Accordingly, there is no further action required under the PRA.

Alejandro N. Mayorkas

Secretary,

U.S. Department of Homeland Security

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